Hydro-Brake®

Vortex Valve Flow Control Device

Product Profile

A sustainable, self-activating flow control solution that uses vortex motion to accurately restrict flows with the largest possible opening without the need for moving parts or external power requirements. The Hydro-Brake® Vortex Valve can be used to minimize storage volumes and ensure efficient use of the system profile.

Applications

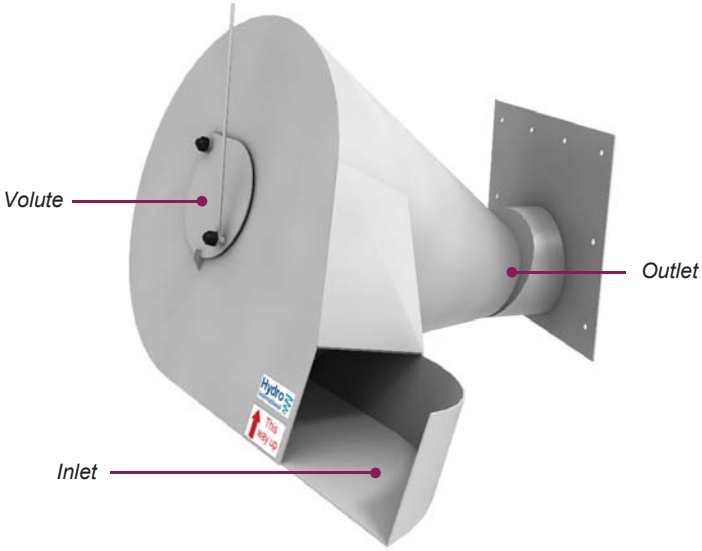
- Inlet and system flow control
- Collection system and storage basin optimization
- Velocity and energy dissipation of flow streams
- Flow control at POTWs, detention basins and diversion structures
- Outlet flow control for retention / detention systems
- Green Infrastructure schemes such as “Blue Roof” detention schemes
- Flow control for flood alleviation schemes

Advantages

- No power and no moving parts
- Virtually maintenance free
- Openings up to 6 times larger than conventional flow controls
- Adaptable, efficient, and self-activating
- Installation is quick and easy
- Options available for adjusting flow rates after installation
- Robust and corrosion resistant materials of construction
- No off the shelf designs, custom designed for each application

Performance

- Installed units can handle 0.10 to 275 mgd through one device
- Performance proven with thousands of installations worldwide



How it Works

The Hydro-Brake® Vortex Valve optimizes flow control by allowing higher discharge rates at lower heads than conventional flow control options. The head / discharge curves and figures that follow illustrate the potential storage volume savings offered by a Hydro-Brake® compared to an orifice.

The Hydro-Brake® operates on simple fluid hydraulics. Flow enters the volute tangentially through the intake. Under low flow conditions, the Hydro-Brake® acts as a large orifice where water and debris pass directly from the inlet to the outlet as shown in Figure A.

As flow increases and reaches the Flush-Flo™ point, high peripheral velocities start to throttle flow. As the head continues tp increase, the valve approaches the Switch-Flo™ and Kick-Flo™ points and an air-filled core starts to form in the volute. The air core fully stabilizes and the valve discharge is throttled to that of a smaller orifice (see Figure B) once the design point is reached.

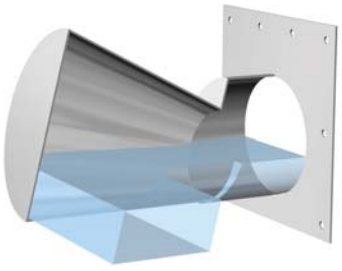


Figure A. Free Flow

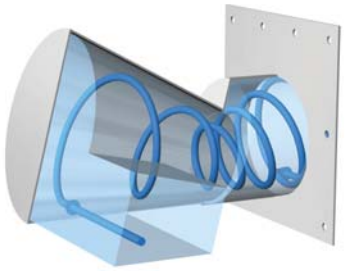
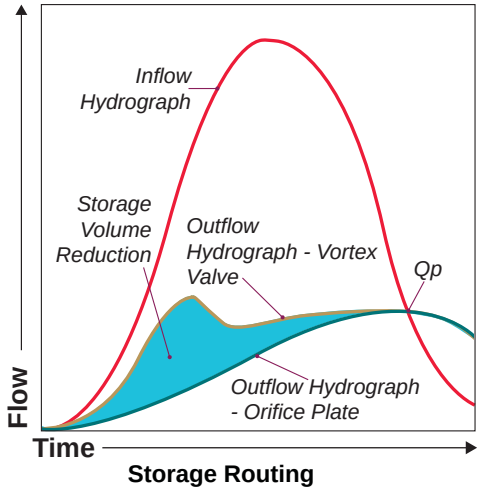


Figure B. Controlled Flow

Types of Hydro-Brake® Vortex Valves

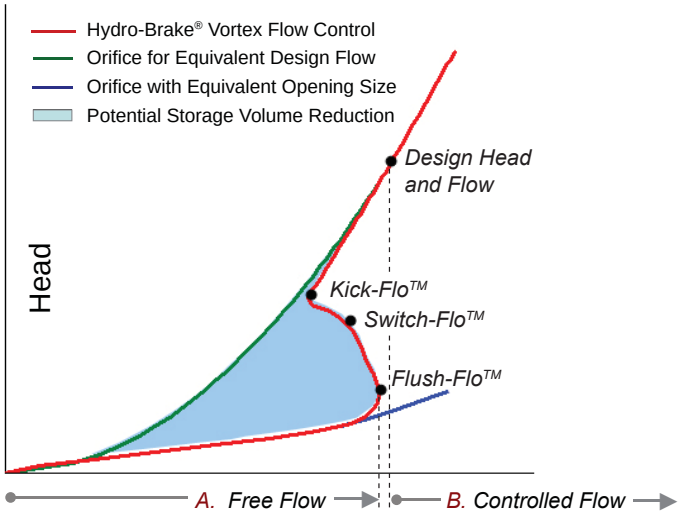
Series	Models	Overview
	***C-Series*** C, CH, CX	This conical unit provides excellent control for stormwater, sanitary and combined sewer flows, particularly in high flow applications. The 'C' Series valves exhibit the characteristic S-shaped head / discharge curve, allowing dry weather flow to pass without restriction and reducing overall storage requirements.
	***S-Series*** SH, SXH, STH, SXMH	The 'S' Series valves are characterized by their horizontal outlet and are only used to control stormwater flows. They are not typically used for sanitary flow control applications as they require sumps, but offer the most efficient and pronounced S-shaped head / discharge characteristic.
	***T-Series*** TH	The 'T' Series is a tubular unit with a slotted and adjustable intake, suited to low head / high flow applications. The TH has no 'kick back' and is typically used for flow balancing.
	***V-Series*** SV, SVX, SMV	The 'V' Series valves are characterized by their vertical outlets and are generally used to control stormwater flows and for sanitary and combined sewer flow control applications. They are also used for inlet control and for regulating the outflow from equalization tanks and detention ponds.

Outflow Curves



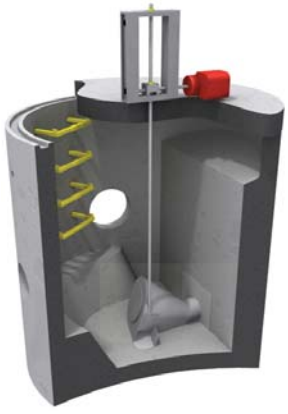
Storage Routing

The plot above shows the outflow curves for both the orifice plate and Hydro-Brake® Vortex Valve superimposed on top of each other. The blue shaded area represents the difference in storage volume that needs to be provided depending on the type of valve used to control the outflow. The Hydro-Brake® Vortex Valve can often achieve a 30% reduction in storage.

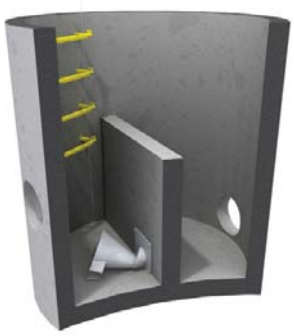


The Hydro-Brake® Vortex Valve outperforms conventional flow control devices. Its unique S-shaped head discharge curve comprises two distinct phases. As the head increases, a transition takes place from free flow (lower portion of the curve) to vortex controlled flow (upper portion of the curve).

Configurations

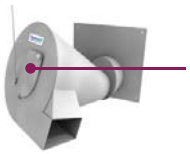


Electrically Actuated Hydro-Brake®

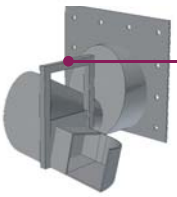


Floor Mounted Hydro-Brake® for Treatment Plant Flow Control

Optional Design Features



Pivoting By-Pass Door
Recommended for all controls, the door is attached to the back plate of the control unit to allow easy system drain down for maintenance purposes and access to the downstream sewer.



Adjustable Intake Gate
Allows for modification of the unit's flow rate.



Vortex Suppressor / Vent Pipe
Inhibits vortex motion by introducing water into the air core, thereby increasing flow by up to 50% with a very small increase in head.



Flexible Installation
Controls can be supplied with different types of mounting including curved mounting plates, push-fit spigots, slide mounted, and attached to gate valves